CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1]a. 0.1 to 30 weight % of polyglyceryl-fatty-acid-ester type nonionic surfactants which are a reactant of polyglycerin whose average degrees of polymerization are 5-15, and fatty acid which has the presentation of 75 weight % or more of oleic acid purity, b. Oil-in-water type microemulsion containing 40 to 80 weight % of polyhydric alcohols, 0.1 to 20 weight % of c. oily matter, and 5 to 59.8 weight % of d. water.

[Claim 2]a. 0.1 to 30 weight % of polyglyceryl-fatty-acid-ester type nonionic surfactants which are a reactant of polyglycerin whose average degrees of polymerization are 5-15, and fatty acid which has the presentation of 75 weight % or more of oleic acid purity, b. A cosmetic containing oil-in-water type microemulsion which comprises 40 to 80 weight % of polyhydric alcohols, 0.1 to 20 weight % of c. oily matter, and 5 to 59.8 weight % of d. water.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]About the cosmetic containing stable oil-in-water type microemulsion and it, this invention is excellent in heating stability, temporal stability, and the stability from cold storage in more detail, and relates to the cosmetic containing oil-in-water type microemulsion and it applicable to various oily matter.

[0002]

[Description of the Prior Art]When blending oily matter, such as perfume, oil-soluble vitamin, ester oil, fats and oils, and a hydrocarbon oil, with the product which generally presents liquid at ordinary temperature also in the cosmetic for the skins, or a bath cosmetic, solubilizing, distributing thru/or emulsifying using ethanol and a surface active agent is performed. However, using ethanol in consideration of allergy etc. especially in recent years may not be

liked. Although there are an ionic surfactant and a nonionic surfactant as a surface active agent, nonionic surfactants, such as lecithin, polyoxyethylene sorbitan ester, polyoxyethylene hardening castor oil, and sucrose fatty acid ester, are usually used from the field of safety.
[0003]However, when [which is depended on above-mentioned ethanol and nonionic surfactant] solubilizing, distributing, thru/or emulsifying and blending, there are many restrictions of the oily matter to be used and it is necessary not only to blend many surface active agents, but they tended to produce separation etc. by aging or a temperature change. It was difficult to blend especially polar oil, such as triglyceride, stably. On the other hand, microemulsion is the aqueous micellar solution or micell oil-soluble liquid which solubilized an oil or water and swelled, and the thermodynamically stable thing is known. If it blends with a cosmetic after making oily matter into microemulsion, a stable system is obtained by combination of a little surface active agents, and it is especially suitable for solubilization of the oily matter to transparent face toilet, baths, etc.
[0004]In microemulsion, unstable oily matter is generally [vitamin A, vitamin D vitamin E, linolic acid, docosahexaenoic acid, eicosapentaenoic acid, etc.] saved as comparatively stable status. The former. . [as microemulsion used for the cosmetic] the emulsion (JP,S63-126544,A) which combined ** ester oil and a nonionic surfactant, and the emulsion (JP,H1-288330,A.) which combined specific oil, a hydrophilic surfactant, and alcohols Although there are an emulsion (JP,H2-157035,A) etc. which combined JP,H1-293131,A and JP,H6-40877,A, a polyglycerin polyoxyethylene butyl ether compound, and unsaturated fatty alcohol, The oily matter which uses all was limited, and flexibility is low and tended to produce separation and muddiness with prolonged heating etc.
[0005]
[Problem to be solved by the invention]This invention solves the above-mentioned technical problem, and it excels in heating stability, temporal stability, and the stability from cold storage, and aims at providing the cosmetic containing oil-in-water type microemulsion and it applicable to various oily matter.
[0006]
[Means for solving problem]In order to solve the above-mentioned technical problem, when research was repeated, it came to obtain the target oil-in-water type microemulsion by combining polyglyceryl fatty acid ester, the polyhydric alcohol, oily matter, and water which have a specific presentation by a specific ratio.
[0007]Namely, 0.1 to 30 weight % of polyglyceryl-fatty-acid-ester type nonionic surfactants which are a reactant with the fatty acid in which this invention has the presentation of polyglycerin whose a. average degrees of polymerization are 5-15, and 75 weight % or more of oleic acid purity, b. It is a cosmetic containing the oil-in-water type microemulsion and it containing 40 to 80 weight % of polyhydric alcohols, 0.1 to 20 weight % of c. oily matter, and 5

to 59.8 weight % of d. water.

[0008]

[Mode for carrying out the invention]The average degrees of polymerization of glycerol of a. polyglyceryl-fatty-acid-ester type nonionic surfactant used for this invention are 5-15, and are 8-12 preferably [it is desirable and] to 7-13, and a pan. Since hydrophilicity will become strong if an average degree of polymerization is smaller than five, it becomes difficult to form oil-in-water emulsion, and if larger than 15, handling will worsen extremely. Here, the average degree of polymerization of glycerol is called for with a hydroxyl value, for example, the hydroxyl value of decaglycerol which is the average degree of polymerization 10 is 890.

[0009]Fatty acid is 75 weight % or more of oleic acid purity, and is 85 weight % or more still more preferably 80weight % or more preferably. If oleic acid purity is smaller than 75%, the temporal stability and heating stability of microemulsion will worsen. As a reaction molar ratio of polyglycerin and fatty acid, the ranges of polyglycerin/fatty acid =0.8 / 1 - 1.5/1 are 0.9 / 1 - 1.3/1 desirable still more preferably. A molar ratio is not preferred from lipophilic property becoming strong if smaller than 0.8/1, being in the trend which becomes difficult to form oil-in-water emulsion, many polyglycerin being included as an impurity, when larger than 1.5/1, and activator purity becoming low.

[0010]b. polyhydric alcohol used for this invention is a compound which has two or more hydroxyl groups generally used for a cosmetic, Ethylene glycol, diethylene glycol, polyethylene glycol, Propylene glycol, dipropylene glycol, polypropylene glycol, 1,3-butylene glycol, glycerol, diglycerol, polyglycerin, sorbitol, maltitol, etc. are mentioned, and they are propylene glycol, dipropylene glycol, 1,3-butylene glycol, and glycerol preferably.

[0011]c. oily matter used for this invention is all the oily matter from polar oil generally used for cosmetics to a nonpolar oil, and there are a natural thing and a composite thing. Specifically Beta-carotene, an ATONA pigment, turmeric oleoresin, curcumin, shrimp color, krill color, Oil-soluble extractives, such as oil-soluble pigments, such as marigold color and lithospermum root color, and an oil-soluble glycyrrhiza extract, Perfume, such as menthol, eugenol, geraniol, and a volatile oil, vitamin A, Natural oil fat, such as oil-soluble vitamins, such as vitamin D and vitamin E, an antioxidant, an ultraviolet ray absorbent, a preservative, a germicide, an animal oil, and a vegetable oil, ester oil, a hydrocarbon oil, silicone oil, fluorine system oils, etc. are mentioned, and they are perfume, an oil-soluble vitamin, an ultraviolet ray absorbent, natural oil fat, etc. preferably.

[0012]Generally d. water used for this invention is used for cosmetics, and purified water, such as ion exchange water and distilled water, tap water, natural water, alkali ion water, etc. are mentioned.

[0013]A polyglyceryl-fatty-acid-ester type nonionic surfactant which is a. component of this invention is preferably contained one to 15weight % still more preferably 0.5 to 20weight % 0.1

to 30weight % in the constituent whole quantity. At less than 0.1 weight %, if heating stability and temporal stability worsen and exceed 30 weight %, it is disadvantageous not only producing gelling but in cost.

[0014]b. Contain preferably a polyhydric alcohol which is a component 50 to 70weight % still more preferably 45 to 75weight % 40 to 80weight % in the constituent whole quantity. At less than 40 weight %, if heating stability and stability from cold storage worsen and exceed 80 weight %, temporal stability will worsen.

[0015]c. Contain preferably oily matter which is a component one to 10weight % still more preferably 0.5 to 15weight % 0.1 to 20weight % in the constituent whole quantity. Since there are too few loadings of oily matter at less than 0.1 weight %, if an effect of this invention becomes difficult to form an emulsion and it is not not only fully demonstrated, but exceeds 20 weight %, gelling etc. will be produced and preparation of microemulsion will become difficult.

[0016]d. Contain preferably water which is a component seven to 48weight % still more preferably five to 54weight % five to 59.8weight % in the constituent whole quantity. At less than 5 weight %, a problem is produced in temporal stability and a maximum is 59.8 weight % from the combination range of other components of this invention.

[0017]It is also possible to blend various additives with a cosmetic containing microemulsion of this invention and it in the range which does not spoil performance of this invention. For example, nonionic surfactants, such as polyoxyethylene alkyl ether and polyoxyethylene sorbitan ester, Amphoteric surface active agents, such as alkyl dimethylamino betaine acetate and alkylamino acetate, Anionic detergent, such as an acyl methyltaurine salt, alkyl ether sulfuric ester salt, and an amide-ether-sulfate salt, pH modifiers, such as water soluble polymers, such as xanthan gum, a carboxyvinyl polymer, carboxymethylcellulose, hydroxypropylmethylcellulose, and hydroxyethyl cellulose, an acid and an alkali, mineral salt, and organic salt, can be blended.

[0018][preparation of the microemulsion of this invention] It is preferred to perform homogenization treatment with homogenization treatment machines, such as a very-high-pressure homogenizer, a Micro fluidizer, a nano mizer, and Altima IZA, and it is preferred that homogeneous pressurization performs homogenization treatment especially using a Micro fluidizer above 1000kg[/cm] ^{2}. Although the amount of addition in particular in the case of furthermore blending the microemulsion of this invention with a cosmetic is not limited, when the effect of oily matter is taken into consideration, it is 0.1 weight % or more still more preferably 0.01weight % or more preferably.

[0019]The cosmetics used for this invention are all cosmetic and bath cosmetics that are directly used for the skin or hair, and their transparent thing is especially preferred. For example, they are face toilet, a body lotion, liquid pomade, a hair tonic, a hair restorer, baths, etc.

[0020]

[Working example]Next, an embodiment explains this invention still in detail.

The microemulsion shown in Table 2 and 3 using the polyglyceryl-fatty-acid-ester type nonionic surfactant shown in the one to Embodiments 1-7 and comparative example 10 table 1 was prepared, and the following method estimated. A result is shown in Table 2 and 3. The microemulsion shown in Table 2 and 3 was prepared as follows. That is, it mixed to a 500-ml beaker, adding the water which is the polyhydric alcohol and d. component which are the polyglyceryl-fatty-acid-ester type nonionic surfactant and b. component which are a. components, and dissolved in it completely. It mixed adding the oily matter which is c. component in the solution, the Micro fluidizer [Form : M-110 E/H and product made from ****** Industry] performed homogenization treatment by homogeneous pressurization 1500kg/cm^2 and the one number of times of a path, and transparent microemulsion was obtained.

[0021](1) The aspect of the emulsion in 25 ** of transparency was observed, and the three-stage shown below estimated. When the judgment was O on both test conditions, it considered it as O, when it was ** on at least one conditions, it considered it as **, and when at least one side was x, it was taken as x.

O : transparency fitness (it is a uniform transparent fluid.)

**: Transparency and ** are poor (although it is uniform, it has muddiness a little.).

x: Poor transparency (it is cloudy or has dissociated.)

[0022](2) The heating stability sample was heated for 5 minutes at 30 minutes and about 130 ** at about 80 **, the aspect was observed after cooling, and the three-stage shown below estimated.

O : heating stability fitness (it is a uniform transparent fluid and there is no change of an aspect.)

**: Heating stability and ** are poor (muddiness is produced separation or a little a little.).

x: Poor heating stability (it becomes cloudy or dissociates.)

[0023](3) The temporal stability sample was sealed in the clear glass container, settlement preservation was carried out for one month with the thermostat (0 **, 25 **, and 45 **), the aspect was observed, and the three-stage shown below estimated.

O : stability fitness (also on which temperature conditions, it is a transparent fluid, and there is no change of an aspect.)

**: Stability and ** are poor (on one of temperature conditions, muddiness is produced separation or a little a little.).

poor x:stability (in one of temperature conditions -- coagulation -- or it dissociates or becomes cloudy.)

[0024](4) Settle for 6 hours and make it restore liquefied at a room temperature, after solidifying the stable sample from cold storage at -20 **. The aspect after repeating this

operation 3 times was observed, and the lower three-stage estimated.

O : stable fitness (it is a uniform transparent fluid and there is no change of an aspect.)

**: Stability and ** are poor (it thickens or separation is produced a little.). Or it has muddiness a little.

poor x:stability (coagulation -- or it dissociates or becomes cloudy.)

[0025]

[Table 1]

表1

ポリグリセリン脂肪酸エステル型非イオン性界面活性剤	原料			反応モル比	水酸基価
	ポリグリセリン		脂肪酸	(ポリグリセリン/脂肪酸)	
	水酸基価	平均重合度	オレイン酸純度(%)		
A	890	9．9	80	1／1	600
B	892	9．7	85	1／1	606
C	886	10．2	90	1／1	588
D	890	9．9	99	1／1	598
E	888	10．0	65	1／1	598

[0026]

[Table 2]

表2

	実施例（重量%）						
	1	2	3	4	5	6	7
a．A	10	—	—	—	1	5	—
a．B	—	14	—	—	12	—	8
a．C	—	—	12	—	—	—	—
a．D	—	—	—	13	—	—	—
E	—	—	—	—	—	—	—
b．グリセリン	—	—	30	52	—	68	20
b．プロピレングリコール	—	—	—	—	55	—	—
b．ジプロピレングリコール	80	—	—	—	—	—	—
b．1.3-ブチレングリコール	—	80	35	—	—	—	40
c．ビタミンA	7	—	—	—	—	—	—
c．ビタミンE	—	9	—	—	—	—	2
c．マリーゴールド色素	—	—	—	8	—	—	—
c．油溶性甘草抽出	—	—	—	—	9	—	—
c．ラベンダー油	—	—	8	—	—	—	—
c．レチノール	—	—	—	—	—	—	1
c．ゲラニオール（合成香料）	—	—	—	—	—	5	2
d．精製水	23	17	15	27	23	22	27
計	100						
透明性	○	○	○	○	○	○	○
加熱安定性	○	○	○	○	○	○	○
経時安定性	○	○	○	○	○	○	○
低温保存からの復元性	○	○	○	○	○	○	○

[0027]

[Table 3]
表3

	比較例（重量%）						
	1	2	3	4	5	6	7
a. A	—	—	—	—	—	—	3
a. B	—	—	—	—	—	3	12
a. C	—	—	—	—	10	—	—
a. D	—	—	33	—	—	—	—
E	—	—	—	12	—	—	—
b. グリセリン	—	—	—	20	—	—	—
b. プロピレングリコール	—	—	40	—	—	88	20
b. ジプロピレングリコール	60	—	—	—	35	—	—
b. 1,3-ブチレングリコール	—	57	—	30	—	—	30
c. ビタミンA	—	—	—	—	—	—	—
c. ビタミンE	8	—	10	—	—	—	—
c. カーミノールド色素	—	—	—	—	—	—	—
c. 油溶性甘草エキス	—	—	—	10	—	—	—
c. ラベンダー油	—	10	—	—	—	—	—
c. L-メントール	—	—	—	—	—	—	2
c. グラニオール（合成香料）	—	—	—	—	8	2	20
d. 精製水	22	18	17	28	47	7	13
モノラウリン酸ポリオキシエチレン(20)ソルビタン	10	—	—	—	—	—	—
酵素処理ルチン	—	15	—	—	—	—	—
計	100						
透明性	○	×	×	○	△	○	×
加熱安定性	△	×	×	○	△	○	×
経時安定性	×	×	×	×	×	×	×
低温保存からの復元性	○	×	×	△	×	○	×

[0028]The microemulsion using the component of this invention excelled Embodiments 1-7 in heating stability, temporal stability, and the stability from cold storage. On the other hand, performance sufficient in the comparative examples 1-7 is not obtained. That is, according to the comparative example 1 and the comparative example 2, since a. component was transposed to nonionic surfactants other than this invention and blended, heating stability and temporal stability are getting worse, and by the comparative example 3, it has solidified from a. component being blended across the range of this invention, and being. In the comparative example 4, since the presentation of the polyglyceryl-fatty-acid-ester type nonionic surfactant of a. component separates from the range of this invention and is blended, temporal stability and the stability from cold storage are getting worse. And it not only gels a little immediately after preparation, but [since b. component is blended in the comparative example 5 less than the range of this invention,], Temporal stability and the stability from cold storage are getting worse, and in the comparative example 6, since b. component is blended across the range of this invention, temporal stability is getting worse. In the comparative example 7, since c. component was blended across the range of this invention, it was completely cloudy

immediately after preparation.

[0029]The transparent face toilet shown in Table 4 using the microemulsion of eight to embodiment 14 Embodiment 1, Embodiment 2, Embodiment 6, and Embodiment 7 was prepared, and the following method estimated. A result is shown in Table 4.

[0030](1) The aspect of the face toilet in 25 ** of transparency was observed, and the three-stage shown below estimated.

O : transparency fitness (it is a uniform transparent fluid.)

**: Transparency and ** are poor (although it is uniform, it has muddiness a little.).

x: Poor transparency (it is cloudy or has dissociated.)

[0031](2) The temporal stability sample was saved for one month at 5 **, 25 **, and 40 **, the aspect was observed, and the three-stage shown below estimated.

O : stability fitness (also on which temperature conditions, it is a transparent fluid, and there is no change of an aspect.)

**: Stability and ** are poor (on one of temperature conditions, muddiness is produced separation or a little a little.).

x: Poor stability (on one of temperature conditions, it dissociates or becomes cloudy.)

[0032](3) Settle for 6 hours and make it restore liquefied at a room temperature, after solidifying the stable sample from cold storage at -20 **. The aspect after repeating this operation 3 times was observed, and the lower three-stage estimated.

O : stable fitness (it is a uniform transparent fluid and there is no change of an aspect.)

**: Stability and ** are poor (separation is produced a little.). Or it has muddiness a little.

x: A stable defect (it dissociates or becomes cloudy.)

All of the face toilet of Embodiments 8-14 excelled Table 4 in transparency, temporal stability, and stability.

[0033]

[Table 4]

表4

	実施例（重量%）						
	8	9	10	11	12	13	14
マイクロエマルション1（実施例1）	2	—	—	—	—	—	—
マイクロエマルション2（実施例2）	—	1	—	—	—	—	—
マイクロエマルション6（実施例6）	—	—	1	1	—	—	—
マイクロエマルション7（実施例7）	—	—	—	—	3	2	2
グリセリン	5	5	5	2	2	7	—
ジプロピレングリコール	—	—	—	4	3	—	4
1,3-ブチレングリコール	3	3	3	—	—	5	2
20% ソルビトール水溶液	—	3	—	—	3	3	—
1% ヒアルロン酸ナトリウム水溶液	—	1	—	0.5	—	1	—
50% ピロリドンカルボン酸ナトリウム水溶液	—	0.5	—	—	0.5	—	0.2
クエン酸・1水和物	0.1	0.05	0.1	0.1	0.1	0.05	0.1
クエン酸3ナトリウム・2水和物	0.3	0.5	0.3	0.15	0.3	0.5	0.15
エタノール	—	—	—	5	—	3	5
メチルパラベン	0.1	0.1	0.1	0.1	0.1	0.1	0.1
フェノキシエタノール	0.2	0.2	0.2	0.2	0.2	0.2	0.2
精製水	残部						
計	100						
透明性	○	○	○	○	○	○	○
経時安定性	○	○	○	○	○	○	○
低温保存からの復元性	○	○	○	○	○	○	○

[0034]The transparent baths shown in Table 5 using the microemulsion of 15 to embodiment 21 Embodiment 1, Embodiment 3, Embodiment 4, and Embodiment 5 were prepared, and the following method estimated. A result is shown in Table 5.

[0035](1) The aspect of the baths in 25 ** of transparency was observed, and the three-stage shown below estimated.

○ : transparency fitness (it is a uniform transparent fluid.)

**: Transparency and ** are poor (although it is uniform, it has muddiness a little.).

x: Poor transparency (it is cloudy or has dissociated.)

[0036](2) The temporal stability sample was saved for one month at 5 **, 25 **, and 40 **, the aspect was observed, and the three-stage shown below estimated.